UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

BIG HOLE BASIN INSECT CONTROL PROJECT

Beaverhead National Forest

Progress Report for the Season of 1927

December 14, 1927

GOVERNMENT PRINTING OFFICE

BIG HOLE BASIN INSECT CONTROL PROJECT

Progress Report for the Season of 1927

Contents.

	Page
INTRODUCTION	1
HISTORY OF PROJECT	1
CHARACTER OF INFESTATION	3
ENTOMOLOGICAL PLAN OF CONTROL	4
1927 CONTROL OPERATION	5
Spotting	6
Treating	7
Project Organization	8
Costs	10
MEMORANDA	17
FOREST INSECT SURVEY	18
RECOMMENDATIONS FOR SEASON OF 1928	21
PHOTOGRAPHIC SECTION	

BIG HOLE BASIN INSECT CONTROL PROJECT

Progress Report for the Season of 1927

****

INTRODUCTION

The scope of this report will include an account of the 1927 control operation, the results of the past season's insect survey, and recommendations for the continuation of the project in 1928. Though the history of this project which started in 1924 can be found in past reports, it seems advisable to include a brief summary of the project as a convenience to the reader.

HISTORY OF PROJECT

In 1923 it was realized that the epidemic of the mountain pine beetle which had been present within the northern portion of the Missoula National Forest for several years was firmly established in the timber stands many miles to the south. In an attempt

to stop the spread of this infestation control measures were instituted against what was believed to be its furthest advance elements. During this operation which was located near Philipsburg, Montana, approximately 1000 trees were treated. From an insect survey which followed the close of this operation it was found that instead of having treated the advance elements the head of the infestation was still many miles to the south. A serious epidemic condition existed on the East Fork of the Bitterroot River and in 1925 it was necessary to move the control operations to that region. During the control season of 1925 some 7725 trees were treated around what appeared to be the edge of the heavy infestation. There were however thousands of trees left untreated.

An insect survey conducted during the summer of 1925 showed that the insects had started to cross to the east side of the Continental Divide and were fairly well established within that region. This fact made it necessary to extend the control operation to include the west side of the Big Hole Basin in the 1926 plan of control. During the control season of 1926 there were 1244 trees treated within the Bitterroot and 5271 within the Big Hole Basin. The heavy flight of beetles from the Bitterroot to the Big Hole Basin which occurred during the summer of 1926 made it necessary to forego further control within the Bitterroot and to concentrate all available funds upon the Big Hole Basin for the 1927 season.

CHARACTER OF THE INFESTATION

At the present time the head of the infestation rests upon the East Fork of the Bitterroot River. It seems impossible to attempt a depiction of the severe losses of lodgepole pine and yellow pine which have occurred within this region during the past few years. In the heart of the infestation the dead trees occur in practically solid blocks covering many square miles. The spread of the epidemic from these solid blocks occurs first as large groups of infested trees, which in turn give way to the smaller groups and isolated individuals at the limits of the spread. The distance which these insects are able to fly is still debatable, but it is known that they can fly six or seven miles.

From the heart of the infestation in the Bitterroot the epidemic is apparently spreading in three directions. To the north the insects have spread through the Bertie Lord, Moose, and Martin Creek drainages, and will undoubtedly reach those of the Weeping Child and Skalkaho within a few years. To the southwest there is an annual encroachment into the Tolan and Mink Creek drainages, and it is possible that in time the epidemic may reach the valuable timber stands of the West Fork. Across the Continental Divide the insects are spreading south into the Big Hole Basin, where they are firmly established.

ENTOMOLOGICAL PLAN OF CONTROL

The magnitude of this infestation made the thought of treating all the infested trees in any one season seem prohibitive. This position seemed warranted because of the tremendous expense of such an operation, as well as the physical difficulty of covering all of the infested area in one year. However, in order to prevent the spread of this infestation through the Big Hole Basin and into the valuable timber stands to the south, the Forest Service and Bureau of Entomology approved, on an experimental basis, what has been called a defense zone plan of control. This plan called for the establishment of a zone across the head of the infestation, in which all infested trees were to be treated each year until such a time as the source of reinfestation had been exhausted. Due to funds which were available it was impossible to consider the northern spread of this epidemic, but a zone was established in the hope of preventing further spread to the south and southwest. In 1927 it was again necessary to abandon the Bitterroot portion of this zone and concentrate all available funds within the Big Hole Basin. There is no place within this report for a discussion of the merits of this plan, however it has been adopted as offering what is believed to be the only feasible method of preventing the spread of this epidemic into the valuable timber stands to the south.

1927 CONTROL OPERATION

A preliminary report covering 1927 control operations on the Beaverhead project was submitted July 9, 1927 by C. S. Webb. At that time complete cost and other records were not available and the final report is contained herein.

The project was in charge of C. S. Webb, Logging Engineer, Dist. No. 1, assisted by Thomas Crossley, Chief Lumberman. J. C. Evenden, Associate Entomologist, Bureau of Entomology, handled the work for this Bureau in connection with the project.

The area worked lies on the north and westerly side of the Big Hole Basin, Beaverhead County, Montana. Most of the area is within the Beaverhead Forest, although some work was done east of Pintlar Lake on the Deerlodge Forest. The elevation is approximately 7000 feet above sea level. The area is within Twps'., 1 N., Rg's 15, 16 & 17 West and Twps'., 1, 2, & 3, S., Rg's 16 & 17, West, M.P.M. Montana.

Webb, Crossley and Assistant Supervisor W. I. White arrived at Wisdom, Montana, May 5, to start building the organization necessary for this project. Spring came on very late and bad roads and other working conditions were encountered due to the heavy blanket of snow in places and the almost incessant rain and snowfall during May. On May 6th the organizing of the first camp was started. A truck haul of 55 miles over rather poor roads was necessary in moving supplies and equipment from the railroad at Divide, Montana, to Wisdom. In the Big Hole country very bad roads were encountered and everything hauled out of Wisdom up to

June 10 was done with 4-horse teams and wagon, since trucks could not be used. The material was thus hauled for a distance varying from 12 to 18 miles and then packed 3 to 7 miles out to various camps. Ten camps were established with nine in operation at one time employing 175 men at the maximum.

Deep snow held up the work considerably during the first two weeks and field work was not commenced until May 12 when three spotting crews were put in the field. The number of spotting crews, which consisted of 5 men each, were gradually built up to a maximum of 8 crews. These were taken off about June 15 when it was certain all was spotted which could be treated. The first treating crew was started on May 15. The number of these crews which usually consisted of 7 men and 1 horse was gradually increased until a maximum of 20 crews were in the field.

A. Brief discussion of crew organization and methods used.

Spotting:

Crews were organized consisting of 5 men. Of these, one was in charge and responsible for the work of the crew. He did the compass work, pacing, and mapping, while two men worked on either side of him. Each of these men covered a one-chain-wide strip and searched for infested trees. Each carried a hand axe and all infested trees found were blazed and a cloth tag tacked thereon bearing the crew serial symbol and consecutive number of the tree for this crew, i.e.: Crew "B" marking their 55th tree, tag would show "B-55," thus giving an opportunity to check up on the work as done by each crew. The crews averaged about 4 miles of line

per day with a 4-chain width or approximately 4 to 5 days to the section. A good drainage map was made and the location of all infested trees found was indicated on the map, showing also the numbers given the trees. This facilitated the work of the treating crews, enabling them to readily find the infested trees and check up to see none were missed. A very close combing of the area was made in this way.

Treating

Treating crews were organized consisting of 1 foreman, 2 sawyers, 4 laborers and 1 skid horse, a total of 7 men and 1 horse, all considered as productive. Crews worked with one man extra at times for a day or so and at times some crew would be short 1 or 2 men but the aim was to keep them full handed in so far as possible. In this work after an area or section had been spotted, it was assigned to a crew foreman for the purpose of treating the infested trees. The foreman had charge of and was responsible for the work of his crew. With the aid of the map prepared by the chief spotter the infested trees were located and treated. Most of them were felled and skidded into small decks, with the top slash piled mostly on top and burned. Those that were not cut down were burned standing so as to kill the broods. About 5% were treated standing. This was accomplished by piling dry limbs, sticks and slash from felled trees around the trees and setting them afire. The crews averaged 43 trees per day or 6.15 trees per man-day of 8 hours. Stumps were cut low, about 6" to 9" from the ground, as it was found that in so doing, the brood was practically all taken

and it was not necessary to peel them. More detail on production and costs is given later in this report and a picture section is appended portraying the various steps taken in the work.

Organization:

A review of about what this season's organization consisted of and our criticisms of it are as follows: C. S. Webb in charge of the project for the Forest Service. Thomas Crossley as assistant in charge. James C. Evenden in charge for the Bureau of Entomology. W. I. White, assistant supervisor as chief clerk. Under this organization were the various camps. Each camp was under a camp manager who was responsible for the records of his camp and who was also in charge of one treating crew at his camp. Wherever more than one treating crew was employed at a camp, the extra crews were in charge of a foreman to each crew. In some cases these were Forest officers but temporary men were used as crew foreman as well. The crew foremen were productive and worked along with the small crew of six men. At least one spotting crew was put in each camp and in some camps there were two and three. Each spotting crew of four men was in charge of a Forest officer as chief of spotter.

The main office and warehouse which were handled by White were located at Wisdom. A headquarters camp was established at Wharton's Ranch to where equipment and supplies were delivered by teams and truck and then packed out to the various camps. Crossley handled the details of routing pack train out of head-

quarters and supplying other camps for about two weeks after which it was turned over to another forest officer. Webb and Evenden were in the field practically all the time locating camp sites, attending to the establishment of camps, looking after the distribution of equipment and supplies, organization and starting in of spotting and treating crews and supervision of the work after started. They attended to an endless number of little details which ordinarily they should not have been bothered with, the doing of which reflected against the greatest success of the project in the way of lost motion and lowered production due almost entirely to lack of sufficient supervision. Crossley should not have been tied up at headquarters for two weeks but at the time it was a case of someone being there who could handle the work without requiring supervision. White acted as chief clerk, paymaster, warehouse man, purchasing agent, labor agent and all around general rustler. He had to check in everything that came to the Wisdom warehouse on trucks and then make up the orders and check out everything teamed out to the camps. In the first place he is not a clerk and besides he had too many jobs and details to attend. The object was to set up an overhead organization as light and as economical as possible. The result was money lost in economy overdone. Much help had to be thrown in toward the close of the project in order to round into shape the accounts and records. Many of the men were overworked on details resulting in a lack of supervision where most essentially

needed. Setting out 8 to 10 camps over a stretch of 25 miles and building up a force of 175 men organized into small working units, disbanding and moving in all the equipment again in a period of 6 or 7 weeks is bound to run up a high percentage of lost motion. It is firmly believed that in a proposition of this sort requiring a large volume of work within a comparatively short period, the best measure of economy will result from the overhead organization sufficiently large and trained in particular lines, so as to handle the work with the greatest degree of rapidity and accuracy.

Costs:

The matter of costs in this work is one of the most important things. Costs for the work during the spring of 1926 amounted to $2,273 per tree. In Webb's preliminary report on work done during spring 1927 a total cost of $1.98 is shown. Crediting back, equipment and supply values left on hand a cost of $1.78 per tree is indicated. These costs are changed somewhat since it was found upon the final financial reports that a little more money had been expended and also a few more trees had been treated than were shown in the preliminary report. Following is a record showing the production and costs per tree. In recording this an effort is made to give such detail as will enable one to analyse the cost if desired. It is not believed our present methods of spotting and control are to be improved upon to any great extent.

We believe the production per man-day will be greater if 6 men instead of 7 men are used on a control crew. We also believe in some instances spotting may be done more cheaply by 1 man than by using 5 to the crew and in many places by the use of 3-man crews. Such conclusions as were reached from the light of our experience will be included in our plans for next season's work.

We know the actual spotting and treating of the trees based on the effective man-days does not make up one-half of the total cost. Various factors enter into the total which were costly. Our actual cost of labor under our present methods does not assume an unreasonable figure as to cost per tree. Our production is fair but can be increased somewhat. On this project there were detailed 20 to 25 forest officers. Most of them travelled long distances to and from the job and were, of course, on pay and travel expense status. Their salaries in many cases are higher than for which temporary men could be hired to do the same work. Transportation costs run high, roads bad, weather conditions bad, small camps and a rather difficult labor problem.

Production records and costs follow:

Spotting:	Acres	Trees
Spotted on the Deerlodge	1560	1643
Spotted on the Beaverhead	18520	17248
Total spotted	20080	18891

There were spotted a total of ---------- 18,891 trees

Total effective man-days ---------- 729.7

Total all man-days ---------- 999.2

Spotted per effective man-day ---------- 25.9 trees

Spotted per total man-day ---------- 18.9 trees

Cost based on effective man-days -------- $0.208 per tree

Cost based on total man-days ---------- $0.287 per tree

Treating:	Acres	Trees
Treated on the Deerlodge ----------	1520	1681
Treated on the Beaverhead ----------	17068	15865
Total treated ----------	18,588	17,546

There were treated a total of ---------17,546 trees

Total effective man-days ---------- 2852¾

Total all man-days ---------- 3277⅛

Treated per effective man-day-Crew Basis-- 6.15 trees

Treated per total man-day ----Crew Basis-- 5.35 trees

Cost based on effective man-days ---------$0.662 per tree

Cost based on total man-days ----------$0.739 per tree

Actual labor expense both treating and spotting based on effective days work ---------- 87¢ per tree

Same based on total man-days chargeable --------- $1.026 per tree.

Total noneffective time cost on crews is therefore $.156 per tree. This time was spent in setting up camps, moving camps, cutting wood, hauling hay, building corrals, repairing pasture fences and

other fences which had to be torn apart in connection with the work etc. The above figures include all contributed time as well as that paid from I. C. funds.

The total amount vouchered against I. C. funds is $32,185.34 and contributed is $2,878.05, a total of $35,063.39. Total trees treated 17,546 or a total cost of $2.00 per tree. This is a considerable increase over $1.026 which is the cost per tree based on all crew man-days, both effective and noneffective, excepting the overhead. Loss on board of 50¢ per day has been figured in against every day in reckoning the actual costs of spotting and treating.

In order to show for what the money was spent the following is given:

Based on 17,546 trees treated.

Item	Total Cost		Total for spotting and treating Cost per tree
1. Net payroll for men and horses other than transportation -----	$15,880.49	----	.905
2. Subsistence supplies ----------	8,633.18	----	.492
3. Commissary other than meals ----	605.05	----	.034
4. Horse feed, shoeing, etc. ------	713.84	----	.041
5. Transportation costs ----------	2,609.60	----	.149
6. Equipment and supplies ---------	3,226.38	----	.184
7. Travel ----------	1,864.60	----	.106
8. Miscellaneous ----------	280.25	----	.016
9. Overhead ----------	1,250.00	----	.071
Total	$35,063.39		$1.998

The above includes $2,878.05 contributed time. It also includes $223.68 spent by Evenden and Burdick fall 1926 in connection with survey. Analyzing these we find that:

Item I. Appears high. Somewhat due to higher paid forest officers,

about 20 to 24 on the job. Most came from a distance and were paid for all of their travel time, 2 to 5 or 6 days each while travelling.

Item 2. Appears very high. Considerable wastage to distributing food supplies to so many small camps. Food supplies left over are not credited back.

Item 3. No comment.

Item 4. Seems high. Considering, however, the necessity for a skid horse to each crew, 12 to 14 pack horses, 8 to 12 horses on wagon teams and 3 or 4 saddle horses, the cost is not out of reason.

Item 5. Seems high. Consider hauling 55 miles on trucks, 12 to 18 miles through deep mud with 4-horse teams hauling light loads, then packing out 3 to 7 miles it is probably not too bad. Extremely bad weather and road conditions did not help this to any extent.

Item 6. High as depreciation should only be figured rather than the total cost since practically all equipment is on hand and good for 4 or 5 more seasons of such work.

Item 7. Travel costs out of reason. Largely due to so many forest officers travel expenses and car fare for 2 to 6 days on the road.

Item 8. Largely due to payment of telephone, telegraph and other small items properly chargeable to the project.

Item 9. Includes salaries of men engaged strictly as overhead, including chief clerk.

In order to arrive at figures which should represent the

actual cost of spotting and treating during the spring 1927, it seems essential the following items be considered.

1. The item of $223.68 spent fall 1926 does not enter into actual cost of spotting and treating but is rather a portion of the survey cost.
2. Of subsistence supplies purchased there was inventoried back over $1000.00 worth. These were cased and sacked in good shape and should be used on other projects and the amount credited back on 1927 work.
3. In the purchase of equipment and supplies there was expended $3226.38. This is made up of logging equipment, camp equipment and partial payment on an auto truck. Such equipment should be figured as having a life of 5 seasons of two months each or a 20% annual depreciation chargeable against the job rather than charging the whole value against the one year.
4. Several small items charged to insect control should properly come under Maintenance of Motor Vehicles and Compensation Commission Claims. Vouchers 691, 854, 863, 874, and 1031 contain these items to the amount of $53.20.

1. Credit $223.68 spent on Survey	$223.68
2. Credit $1000.00 subsistence supplies not used	1000.00
3. Credit equipment account by charging 20% depreciation only	2581.10
4. Credit by items which were not chargeable	53.20
Total credit	$ 3857.98

Total expenditure	$35063.39
Credit as above shown	3857.98
Actual Cost	$31205.41
Actual cost per tree treating and spotting	$1.778

This is given by items as follows:	Amount	Per tree
1. Net payroll, men and horses other than transportation	$ 15,852.41	$0.904
2. Subsistence supplies	7,568.24	.431
3. Commissary other than meals	605.05	.034
4. Horse feed, shoeing, etc.	713.84	.041
5. Transportation	2,609.60	.148
6. Equipment and supplies, depreciation	645.28	.037
7. Travel	1,703.39	.097
8. Miscellaneous	257.60	.015
9. Overhead	1,250.00	.071
Approximate true total cost season 1927	$31,205.41	$1.778

As a matter of interest the cost of boarding men is briefly stated. Costs at the 10 camps varied from 46¢ to 62¢ per meal depending upon accessibility, size of camp and efficiency of cooks.

The average cost for the 10 camps is as follows:

Item	Cost per meal
Subsistence supplies	.313
Wages, cooks and flunkies	.105
Transportation costs	.092
Total	.51¢

Therefore the cost per day is $1.53 whereas we charged men $1.00 per day. The loss is figured in foregoing cost figures on man-day costs. Transportation costs are high, in fact really amounting to about 5 cents per pound on food supplies.

Memoranda:

Production:

There were a maximum of 21 control crews. Some worked but a very few days at the latter end. From data kept by the crew foremen we have determined the average diameter and average length treated which is as follows:

Maximum number control crews	21
Effective man-days worked	2852.75
Total number of trees treated	17,546
Total diameter inches (stump) cut	241,789
Average diameter on stump	13.8
Total length treated in feet	473,818'
Average length treated per tree	27'
No. trees treated per effective man-day	6.15
No. feet length treated per effective man-day	168.09
No. diameter inches per effective man-day	84.76

The ratio of length treated in feet to the stump diameter in inches is 1.95.

It is believed this work could be contracted on the basis of stump diameter inch and it should be tried out in an effort to lower costs.

Forest Personnel and Cooperation.

About 20 forest officers from various parts of D-1 and one from D-4 were assigned to the job. Associate Entomologist J. C. Evenden was on the job most of the time. These men showed a fine spirit of cooperation and worked hard in trying to make the project a success. Marshall G. Ramsey, Forest Ranger at the Battlefield, was especially helpful and obliging and assisted materially in getting the work

started. W. I. White served very well as a clerk, worked hard and did the best he could under the conditions. The Supervisors' offices of the Deerlodge and Beaverhead Forests cooperated and helped out in everything asked of them. Their willingness to help is much appreciated. Likewise the offices of Management and Maintenance rendered excellent cooperation and helpful service.

FOREST INSECT SURVEY

To secure an estimate of the number of trees which will require treatment in 1928, as well as their approximate location, an extensive survey of the Big Hole Basin was made during August and September, 1927. The method followed in making this survey was to run mechanically selected strips, one chain wide, throughout the area covered. Along these strips the 1927 attacked trees were counted and their location recorded and these data applied to the acreage covered. It is believed that from these strips a fairly representative sample of the area was secured. It is possible, however, that during the first part of this survey a certain per cent of the infested trees were missed due to some very late attacks following a belated emergence.

Eighty man-days were spent on this survey which included all noneffective as well as productive labor. The following tabulation summarizes the cost and production data of this survey.

ITEMS	TOTAL	PER MAN DAY	
		Effective	Total
Man-days spent on survey	80	52.	80.
Miles of strip	421		
Miles of strip per man-day		8.09	5.26
Number of sample strip acres	3669.12		
Number of sample strip acres per man-day		64.79	42.11
Acres covered by survey	92432.		
Acres covered per man-day		1777.53	1155.40
Total cost of survey.			
Wages 471.41 Expenses 144.00 Transportation 95.78	$711.19	$462.28	$711.19
Cost per man-day		$13.68	$8.89
Cost per mile of strip		$1.10	$1.69
Cost per sample acre		.12	.19
Cost per acre of region surveyed		.005	.008

In presenting the results of this survey the region covered has been divided into four areas, which will be discussed separately.

Area #I West Side of Basin--North of Battlefield.

This area was covered by control work in 1927 at which time there were approximately 18,981 infested trees spotted on some 20,000 acres. The fact that it was impossible to cover all of the infested acreage resulted in a large number of infested trees being left untreated. On the areas covered by control work the 1927 attack does not appear to be as heavy as that which occurred the previous season. This is no doubt due to the benefits derived from the control work and the very light, if any, flight of beetles from the Bitterroot during the 1927 season. It is believed that there were sufficient untreated trees left within the area following the 1927 control operation to account for the present condition. Data secured during the survey indicates that on a greatly increased acreage of some 39,000 acres there are approximately 25,537 trees attacked in 1927.

Area #II West Side of Basin--South of Battlefield.

The survey data secured shows that there are some 15,672 infested trees within this area. The timber in this region is ideal for insect attack, and if the present infestation is left untreated a severe situation will soon develop.

Area #III East Side of Big Hole Basin.

From data secured it is estimated that there are approximately

23,582 infested trees within this area. It is believed that this infestation resulted from a flight of beetles into the area during the 1926 season.

Area #IV Fish Trap--Wise River.

No sample strips were run in this area, and the number of 1927 attacked trees, which has been set at 3000 or more, is but an estimation. In 1926 a red top survey was made of this area which showed practically no 1925 attacked trees. At this time there are small groups of red tops scattered throughout the area.

A tabulation of these areas follows.

Area #I West side of Basin--North of Battlefield	25,537
Area #II West side of Basin--South of Battlefield	15,672
Area #III East side of Basin	23,582
Area #IV Wise River--Fish Trap	3,000
Total	67,791

RECOMMENDATIONS FOR SEASON OF 1928

To continue the plan of control as agreed upon, and which seems to offer the only feasible method of checking the spread of this infestation, at least $100,000 will be required for the season of 1928. This figure is based upon the hopes of being able to show a further reduction in the cost of treatment. To start with a smaller sum would seem unwarranted as it would mean the moving of control operations to the east side of the basin, as it is essential that the infested trees within the advance groups of the

infestation be treated. This would hardly seem advisable as the few miles of open fields between the east and west sides of the basin will not act as a barrier to the spread of the beetles. Furthermore, to abandon the west side would be to lose the advantage of the Continental Divide, for though it has not acted as an absolute barrier, it is believed that it may assist materially in preventing the southern spread of the Bitterroot epidemic. To adopt such a program would only mean a postponement of the inevitable, for as soon as the areas abandoned have built into a heavy infestation, the new areas would again be overwhelmed, and a retreat would again be necessary. Nothing can be said in favor of continuing the project in the area worked last year and allowing the infested trees in the advance areas to go untreated.

In view of these facts it is recommended that the project be discontinued unless at least $100,000 can be allotted for the work in 1928. In considering this allotment it must be recognized that this expenditure will not be final, and that large sums of money will be required during the next few years for the continuation of this project.

Respectfully Submitted,

C. H. Bebb.
Logging Engineer

December 14, 1927

James E. Evenden
Associate Entomologist

Mountain pine beetle infestation in the lodgepole pine stands on the East Fork of the Bitterroot River. This area is just across the Continental Divide from the Big Hole Basin. The white trees are insect-killed, the foliage being red at the time the picture was taken. The remaining green trees are Douglas fir.

Mountain pine beetle infestation in the lodgepole pine stands on the East Fork of the Bitterroot River. This area is just across the Continental Divide from the Big Hole Basin. The white trees are insect-killed, the foliage being red at the time the picture was taken. Many trees can be seen from which the foliage has fallen. The red tops (white trees) represent the 1926 attack.

The infested trees are located and tagged by the spotters. These tags carry the spotting crew symbol, the tree number, and a space for the stump diameter and the length treated. The spotter places his initials in the right-hand corner.

The control crews fell the trees.

The infested bole is cut in 12- to 16-foot lengths, so that they can be easily handled.

The stumps are only 6-8 inches in height. Very little infestation is left on these low stumps and it is not necessary to peel them. This stump has been peeled to show the green cambium.

The trees on the edge of the timber stands and around parks and openings are low, scrubby individuals, which are hard to handle. It is more economical to burn these trees standing whenever possible. Some of these trees have limbs which are infested and which require a horse to skid them to the decks.

The logs are skidded with a horse to the decks.

9

The logs are decked. The size of these decks varies with the number of infested trees within the group. Quite often these decks are built against infested trees.

10

Most of the logs are light and can be easily handled by two men.

11

The log decks are burned. Fires are started on the windward side.

12

In dry weather the brush is not burned on the decks.

13

For an hour or two the decks make a very hot fire.

14

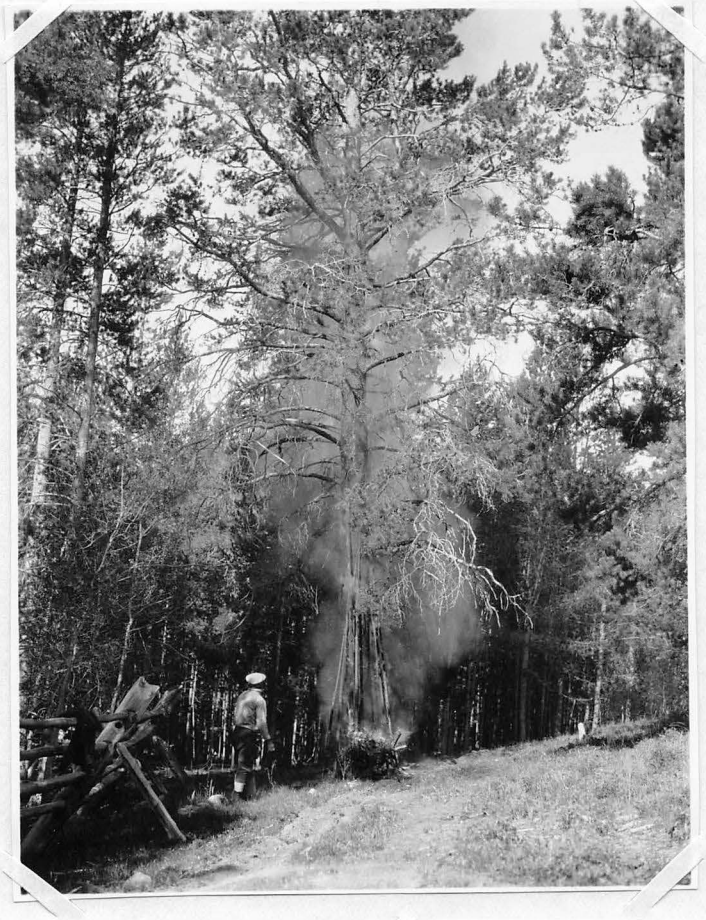
When possible the brush is piled on the log decks and burned with the logs.

15

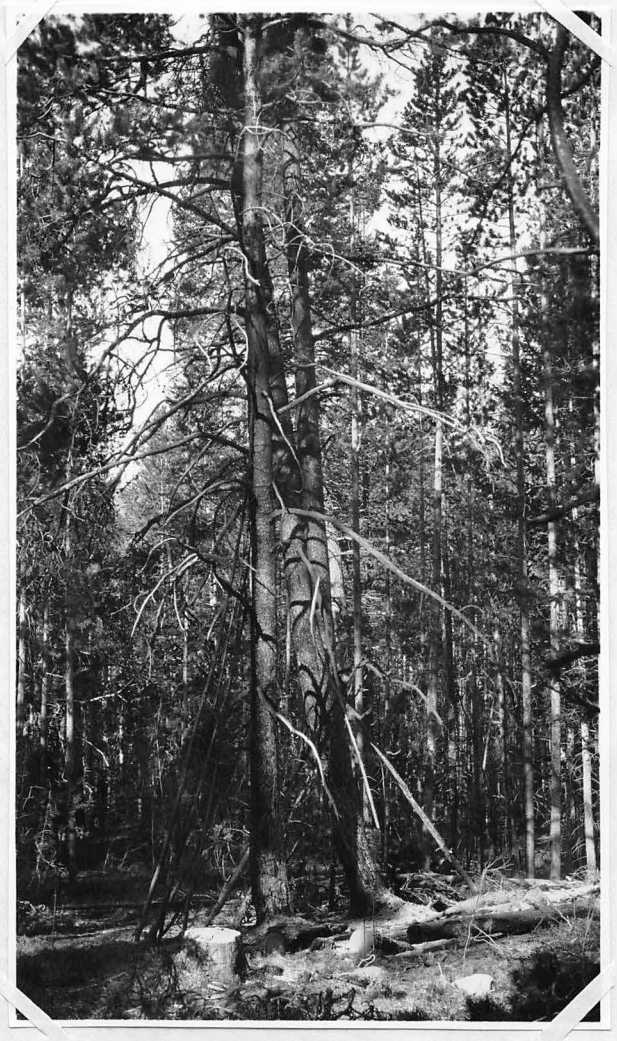
It is only during the latter part of the season that the brush can not be burned on the decks.

A burning log deck covered with brush.

A burned log deck.

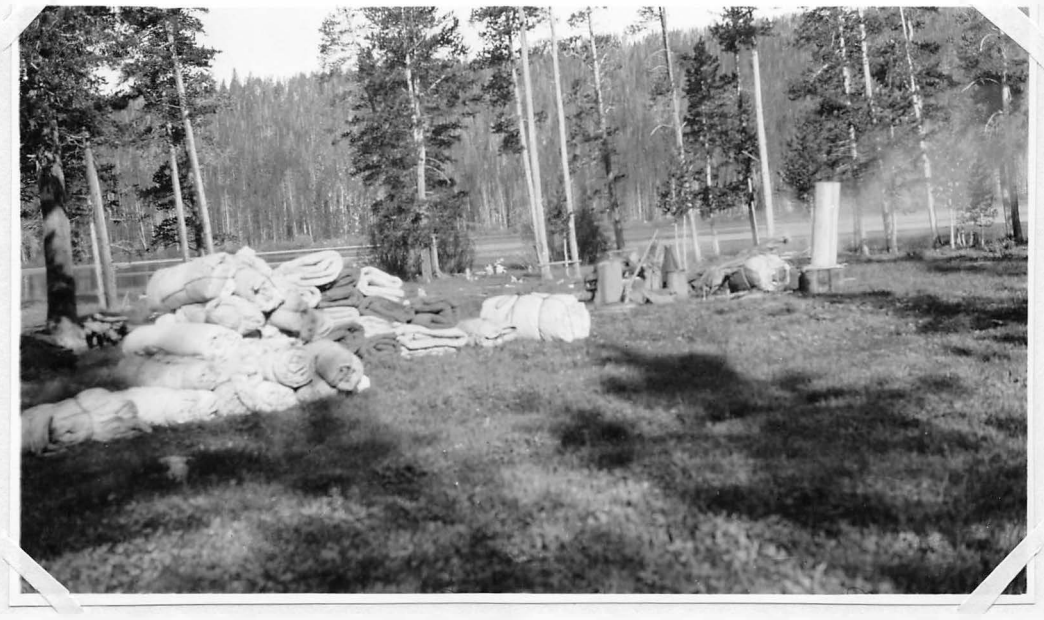


Burning a standing infested tree.



Infested trees which have been burned standing.

Dendroctonus avenue. Headquarters camp.



Breaking camp.

Pack string.

Motor transportation.